

Patent claims

1. Method for production of an encapsulated encapsulation for an electrical component with the method steps:
 - 5 A) a component with metallizations fashioned on a chip (1) is attached to a substrate (25) that comprises electrical connection areas (20), whereby the surface of the chip (1) bearing component structures (5) faces the substrate and bump connections (10) that electrically connect the metallizations with the connection areas affix the chip at a slight distance from the substrate,
 - 10 B) a material (35) is applied such that it covers at least the lower edge of the chip the regions of the substrate abutting the chip,
 - C) a first, continuous metal layer (40) is applied on the back side of the chip, on the material (35) and on edge regions of the substrate abutting the material,
 - 15 D) a second, hermetically sealing metal layer (45) is applied by means of a solvent-free process at least on regions of the first metal layer (40) that cover the material (35).
2. Method according to the preceding claim,
 - 20 - in that a metal foil is melted onto the first metal layer (40) in method step D).
3. Method according to the preceding claim,
 - in that the shape of the metal film is adapted to the contours of the first
 - 25 metal layer (40) before the application, such that it lies on the first metal layer with positive fit.
4. Method according to claim 1,
 - in that metal particles are applied and then melted in the method step D).
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5. Method according to claim 1,

- in that a metal paste is applied and baked in the method step D).
- 6. Method according to claim 1,
 - in that the second metal layer is applied by means of CVD or PVD in the method step D).
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- 7. Method according to any of the claims 1 through 6,
 - in that the second metal layer is sputtered.
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- 8. Method according to any of the preceding claims,
 - in that the second metal layer is continuously applied on the first metal layer.
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- 9. Method according to any of the preceding claims,
 - in that surface layers of the first metal layer are removed before the application of the second metal layer to improve the bonding.
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- 10. Method according to the preceding claim,
 - in that an oxide layer located on the first metal layer is removed via a hydrogen plasma.
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- 11. Method according to any of the preceding claims,
 - in that in method step B) the back side of the chip is covered with a plastic film (30) such that the edges of the film overlap the chip, and subsequently the film is sealed with the substrate in the entire edge region around the chip.
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- 12. Method according to any of the preceding claims,
 - in that the metals for the first and second metal layer and the process conditions are selected such that, in method step D), a metal alloy (50) with a melting point of greater than 260°C is formed at the boundary surface

between the two metal layers during the application of the second metal layer.

13. Method according to any of the preceding claims,
 - 5 - in that tin, tin-silver or tin-silver copper alloys, or a mix of the cited metals, is applied as a second metal layer.
14. Method according to any of the preceding claims,
 - in that titanium/copper is applied as a first metal layer.
- 10 15. Method according to claim 14,
 - in that a tin-copper alloy with a melting point of greater than 260°C is formed at the boundary area between the first and second metal layer.
- 15 16. Method according to any of the preceding claims,
 - in that further chips and/or components are applied on the substrate in the cited manner according to the method steps A) through D), contacted with the substrate and encapsulated.
- 20 17. Method according to the preceding claim,
 - in that the substrate is subsequently isolated into individual components or modules via sectioning between the chips outside of the cited edge regions.
18. Method according to the preceding claim,
 - 25 - in that tin is applied as a second metal layer and titanium/copper is applied as a first metal layer,
 - in that the second metal layer is removed by means of a laser in the region in which the substrate is sectioned,
 - in that the regions of the first metal layer uncovered by the laser are
 - 30 subsequently removed via chemical etching,
 - in that the substrate is subsequently sectioned by means of a saw.

19. Method according to the preceding claim,
 - in that the first metal layer is removed by means of an iron chloride solution.

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20. Use of the method according to any of the preceding claims to encapsulate the surface wave components.